UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,429	07/09/2003	Michael S. Bittar	5080.113	9780

41781 7590 08/26/2004

KAMMER BROWNING PLLC
7700 BROADWAY, SUITE 202
SAN ANTONIO, TX 78209

EXAMINER	
WHITTINGTON, KENNETH J	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/616,429	BITTAR, MICHAEL S.	
	Examiner	Art Unit	
	Kenneth J Whittington	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-16 and 42-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-16 and 42-46* is/are rejected.

7)☒ Claim(s) *47 and 48* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. It is noted that this application claims priority as a divisional of Application Serial No. 10/255,048, filed Sept. 25, 2002, which is a continuation-in-part of Application Serial No. 09/238,832, filed January 29, 1999. However, a review of the file history reveals that an intermediate application has been omitted as well as an indication that some of the applications have issued. Thus, Applicant must amend the specification to include that this application "is a Divisional of U.S. Application Serial No. 10/255,048, filed September 25, 2002, which is a Divisional of U.S. Application Serial No. 09/615,501, filed July 13, 2000, now U.S. Patent No. 6,476,609, issued November 5, 2002, which is Continuation-in-part of U.S. Application No. 09/238,832, filed January 28, 1999, now U.S. Patent No. 6,163,155, issued December 19, 2000."

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract should also not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

3. The abstract of the disclosure is objected to because it recites terms that are implied, for example, line 1 recites that "The invention is directed to" which should be avoided. Additionally, the last sentence refers to speculative applications of the invention. Correction is required. See MPEP § 608.01(b).

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 13-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Minerbo et al. (U.S. 6,304,086). As a preliminary matter, it is noted that this application claims priority to U.S. Application Serial No. 09/238,832, filed on January 29, 1999, which predates Minerbo et al., which has an effective date of September 7, 1999. However, the material of the claims of the present application relates to new matter added into the Continuation-in-part Application Serial

No. 09/615,501, filed on July 13, 2000. Thus, the disclosure of Minerbo et al. qualifies as prior art with respect to this new matter, and accordingly the present claims.

7. Regarding claim 13, Minerbo discloses, with particular reference to FIGS. 7-9 and col. 17, line 41 to col. 18, line 36, an embodiment of an apparatus and method for evaluating resistivity of formations having a tool axis which can be used to optimize performance during a drilling operation based on data collected during the drilling (See col. 1, lines 20-55). The embodiment shown in FIG. 9 comprises a pair of transmitters (FIG. 9, items T1 and T2), each disposed in a plane oriented at an angle with respect to the tool axis (See col. 18, lines 20-25). The transmitters each transmit an electromagnetic wave into the formation, the wave induces an electric current in the formation, and the current induces an induced magnetic wave in the formation (See col. 5, lines 2-35). The embodiment also comprises a pair of receivers (FIG. 9, items R1 and R2), each oriented at an angle with respect to the tool axis, this angle not being equal to either angle of the transmitters (col. 8, lines 28-30). The receivers each receive a pair of the induced magnetic waves, i.e., one from each receiver for a total of four signals between the two receivers, and convert them into an electric signal that is sent to a surface computer (See FIG. 16, item 310 and col. 20, lines 49-61). The four signals sent from the receivers to the surface computer are representative of the resistivity of the formation (See col. 16, lines 7-14). The data can then be processed, recorded or computed as desired to generate a formation conductivity profile indicating the relative position of the tool with respect to the formation, which necessarily includes the bed boundaries (See col. 20, lines 62-65 and note FIGS. 23 and 24) and by collecting such data during a drilling process, the driller will be notified of bed

boundaries and can modify or correct steps of the operation to optimize performance (See col. 1, lines 29-50).

8. Regarding claim 14, Minerbo et al. discloses the transmitters oriented at substantially similar angles (See FIG. 9).

9. Regarding claim 15, while Minerbo et al. does not explicitly show the transmitters oriented at substantially perpendicular angles to the tool axis (See FIG. 9), the discussion with regard to FIG. 9, however, does suggest that the transmitters and receivers may be oriented in a different plane (See col. 18, lines 28-30) and does not limit the angle of orientation of either the transmitter or receiver, as long as the angles are different. Thus, Minerbo et al. discloses that the transmitters shown in FIG. 9 can be perpendicular to the tool axis. Note also that other embodiments of Minerbo et al. disclose the transmitters perpendicular to the tool axis (for example, see FIG. 7).

10. Regarding claim 16, Minerbo et al. discloses the receivers oriented at substantially similar angles (See FIG. 9).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minerbo et al. in view of Luling (US Pat. 5,241,273). Regarding claim 48, Minerbo et al. discloses an apparatus and method for controlling a drilling operation to optimize parameters of the operation based on information collected during the drilling operation (See col. 1, lines 20-55). The apparatus for carrying out the method comprises a first transmitter oriented at an angle to a tool axis (See FIG. 9, item T1), a second transmitter spaced from the first at a second angle to the tool axis (See FIG. 9, item T2), a first receiver between the transmitters oriented at an angle to the tool axis different from the angles of the transmitters (See FIG. 9, item R1), a second receiver between the transmitters oriented at another angle to the tool axis different from the angles of the transmitters (See FIG. 9, item R2) and a processor in communication with each of the transmitters and the receivers.

Each of the transmitters (T1 and T2) transmits an electromagnetic wave into the formation, the wave induces an electric current in the formation, and the current induces an

induced magnetic wave in the formation (See col. 5, lines 2-35). These induced waves can be interpreted as first and second induced electro-magnetic waves.

Each of the receivers R1 and R2 receives a pair of the induced electro-magnetic waves, i.e., one from each receiver for a total of four signals between the two receivers, and convert each received signal into an electric signal (See FIG. 16 and col. 20, lines 49-61). The four electrical signals are representative of the resistivity of the formation (See col. 16, lines 7-14).

The four electrical signals are then sent to a processor which determines a differential signal D_G (See col. 15, lines 5-11) based upon the electrical signals (See FIG. 16, item 310 and col. 20, lines 49-61) and equation 67 (See col. 17, line 49). Although Minerbo et al. only discloses a single differential signal and does not explicitly disclose determining a first and second differential signal, it is inherent in Minerbo et al. that the single differential signal calculation using equation 67 can be split into two separate calculations since such an operation would be a matter of mathematical division of equation 67 into components. Note that:

$$D_G = \frac{1}{2d}(V_{21} - V_{11} + V_{12} - V_{22}) = \frac{1}{2d}(V_{21} - V_{11}) + \frac{1}{2d}(V_{12} - V_{22})$$

$$D_G = \frac{1}{2d}(V_{21} - V_{11}) + \frac{1}{2d}(V_{12} - V_{22}) = D_{G1} + D_{G2}$$

Each calculation D_{G1} or D_{G2} would then simply represent the differential signal determined on the basis of signals received by both receivers R1 and R2 as a result of the transmission of a wave by a single transmitter T1 or T2.

The processor then uses the differential signal D_G (or the pair of differential signals D_{G1} and D_{G2}) to develop an output signal which can be stored as a conductivity profile, which can be used in conjunction with other techniques to keep track of the tool depth within a borehole (See

Minerbo et al. col. 20, line 62 to col. 21, line 4). This information, which can be collected during a drilling operation, can also be used to modify or correct key steps in a drilling operation to optimize performance (See col. 1, lines 40-44).

However, while Minerbo et al. does disclose optimizing performance of a drilling operation, it does not explicitly disclose controlling the drilling direction of the drilling apparatus in response to the output signal. Luling teaches that is well known in the art to employ directional drilling, which is a process of determining the location of a pay zone and changing the direction of the drilling operation so that the drilling is carried out substantially within the payzone (See Luling col. 1, lines 13-26). The process of determining the location of the pay zone can be completed by wireline or resistivity logging (See col. 1, lines 26-66). It would have been obvious to employ the method and apparatus of resistivity logging as disclosed in Minerbo et al. in the directional drilling method known in the art, as described in Luling. One having ordinary skill in the art would have been motivated to do so to provide accurate resistivity profiles (See Minerbo et al. col. 2, lines 53-61) for implementation into a wireline or logging-while-drilling operation (See col. 20, lines 47-48).

Regarding claims 43 and 45, Minerbo et al. teaches that the processing of the voltages measured by receivers R1 and R2 are based on the relative phase delay and attenuation decrement in the data received at the receivers (See Minerbo et al. col. 5, lines 9-18). Furthermore, the resistivity values, either D_{G1} or D_{G2} as noted above, is based upon these values.

Regarding claims 44 and 46, Minerbo et al. further teaches that the calculations for the formation resistivity according to the invention can be made using a ratio of the voltages

received, namely $(V_2-V_1)/V_1$ (See col. 16, lines 52-54). Furthermore, the resistivity values, either D_{G1} or D_{G2} as noted above, would inherently be based upon these ratios.

Allowable Subject Matter

Claims 47 and 48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 47, the reason for the indication of allowable subject matter is that the combination of Minerbo et al. and Luling teaches using the sum of the differential signals to determine the output signal, which has the effect of reducing the spikes of measurement at the bed boundaries. However, the prior art fails to teach the difference of the differential signals as recited in the claim, which has the effect of amplifying the spikes at the bed boundaries.

Regarding claim 48, the prior art fails to disclose using the ratio of the differential signals to determine the output signal.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Habashy et al. (US 5,210,495) and Savage et al. (4,636,731) each disclose apparatus for electro-magnetic logging.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J Whittington whose telephone number is (571) 272-2264. The examiner can normally be reached on Monday-Friday, 7:30am-4:00pmm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nancy Le can be reached on (571) 272-2233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kenneth J. Whittington
Examiner
Art Unit 2862

kjw

JAY PATIDAR
PRIMARY EXAMINER